

***Mycobacterium Tuberculosis* detection techniques on sputum in Kisii-Kenya**
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Abstract

The laboratory diagnosis of pulmonary *tuberculosis* and smear-negative pulmonary tuberculosis in resource limited countries are often based on X-ray and sputum smear microscopy. These diagnostic tools require experts, have long turnaround time, and cannot detect resistance to Tuberculosis (TB) drugs and TB in individuals with Human immunodeficiency virus. Recently there was development of *GeneXpert MTB/Rif* assay that has a short turnaround time and can detect resistance to *rifampicin* among TB patients but its utility has not been evaluated in Kenya. This study investigated the comparative sensitivity and specificity of smear microscopy and culture relative to *GeneXpert MTB/Rif* assay among suspected TB patients. A cross-sectional study was conducted in Nyamira County Referral Hospital among suspected TB patients and both results recorded. Culture for *Mycobacterium tuberculosis* served as the reference standard. The results of this study showed that among 682 enrolled participants, 182(26.69%) were diagnosed TB positive while 500 (73.31%) no TB. *GeneXpert mtb/rif* had a higher *sensitivity* (100%) and *specificity* (99.4%) relative to culture and a positive predictive value of (98.4%) and a negative predictive value of (100%). Smear microscopy revealed low sensitivity (26.4%) and a higher specificity (98.2%). A concordance analysis of smear microscopy and *GeneXpert* was done. The findings revealed a significant (patients showed resistance to either one of the TB drugs (*rifampicin, isoniazid and Ethambutol*) while none of the enrolled patients were resistant to streptomycin. In conclusion *Gene Xpert MTB/Rif* test had high sensitivity compared to smear microscopy. For rifampicin resistance detection, it provided accurate results. My recommendation to the Division of TB and lung diseases is to roll out the Gene Xpert mtb/rif machines to all health care facilities.

Keywords: *Gene Xpert* assay; *Mycobacterium tuberculosis*; HIV; Smear microscopy